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February 3, 1975

Professor Joshua Lederberg
Department of Genetics
Stanford University Medical Center
Stanford, California 94305

Dear Josh:

There has been some work with the genetics of luminous bacteria since 1951, but there is still lots to be done. The most active lab at the present time, as it happens, is right under McElroy's nose: Ken Nealson at Scripps. By copy of this letter, I'll ask him to send you a set of strains closely related to Benekea harveyi, the species about which we know the most, and probably the best for you to work on.

Nealson also has at least 150 auxotrophs of this strain and could send you whatever you might like. Many of them are referred to in the enclosed publications. He (and we) also have copies of the temperature-sensitive (of luminescence) mutants described by Cline. Some of these might be useful to you.

McElroy's report that it is difficult to induce mutations in these organisms has not been confirmed in any of our experiments including work with different strains and species. We find no difficulty in getting mutants with nitrosoguanidine. Nealson's Ph.D. Thesis (University of Chicago, 1969) gives details concerning many different mutagens. The bacteria are very sensitive to U.V. killing, possibly due to a poor repair system, so he never used this as a method.

Bill's reference to heat-induced mutants refers to the fact that dark (= very dim) variants occur with some appreciable frequency and, (as long practiced by Van Niel in his summer course) can be readily obtained from an old culture allowed to incubate at a temperature above optimum for growth (30 - 37°). This is probably a selection of some sort, but this has never been completely sorted out. Using auxotrophs, Nealson (Ph.D. Thesis) showed that it was not due to genetic transfer. He also studied reversion, which occurs readily. The only published reports specifically concerned with this are abstracts (Keynan and Hastings, Biol. Bull. 121, 375, 1961 and Keynan, Veeder, and Hastings, Biol. Bull. 125, 382, 1961). We have lots of additional unpublished results which we will pull together sometime. I think that Bill is off base in suggesting that these usually fall into the "aldehyde" class. They usually do not, perhaps never. They are instead lacking in luciferase and possess no luciferase CRM.

It would be really great to have one of your students working in this area. Please keep us posted and if there is anything we can do, let us know.

I enclose a set of the most relevant reprints plus a bibliography from my lab for the past few years.

Sincerely,

Woody

J. W. Hastings
Professor of Biology

JWH/sb

Enclosures

cc Nealson